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Worldwide Report

ENVIRONMENTAL QUALITY

No. 299

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PLAN TO TACKLE COMMON ENVIRONMENTAL PROBLEMS

Karachi MORNING NEWS in English 3 Mar 81 p 10

[Text] Islamabad, March 2--The ministerial representatives from the eight South Asian countries have launched a joint programme to tackle common environmental problems, adopting the Colombo Declaration establishing the South Asia Cooperative Environment Programme (SACEP), and agreed on working arrangements concerning its implementation.

The countries, which attended the three-day meeting in Colombo from Feb. 23 to 25, organized by the Sri Lanka Government and the United National Environment Programme (UNEP), were: Afghanistan, Bangladesh, India, Iran, Maldives, Nepal, Pakistan and Sri Lanka.

The programme will aim at bringing about a better management of the environment in the region particularly through eliminating the wasteful use of natural resources, on which many development activities depend.

Some of the main functions of the programme are:

--Promoting cooperative activities to deal with major environmental problems concerning development activities;

--Facilitating an exchange of information and expertise among countries concerning environmental issues;

--Using local resources for implementing projects;

--Encouraging support from interested donor countries and other sources.

Although initially members of the Programme will be those states that participated in the Colombo meeting, membership will remain open to other states of South Asia, namely, Bhutan and Burma, which were unable to attend the moot.

Three principal bodies will be responsible for implementing the South Asia programme. They are: the Governing Council--the policy-making body of the organization, a consultative committee, and a secretariat. The secretariat will be located in Colombo. PPI

CSO: 5000

AUSTRALIA

EROSION SEEN AS NATION'S 'MOST SERIOUS PROBLEM'

Canberra THE FINANCIAL AUSTRALIAN in English 3 Feb 81 p 3

[Article by Vernon Graham: "Erosion Shapes as Our Most Serious Problem"]

[Text]

NOT many Australians, especially those living in the big cities, worry about soil erosion.

Most people associate soil erosion with a few ugly gullies washed into the sides of rural hillsides.

They consider it hardly worth worrying about.

Unfortunately, soil erosion is fast becoming the nation's most serious problem — more serious than unemployment.

Wind and rain erosion now affects about 2.5 million sq km, or 52 per cent of our agricultural land.

We must remove this scourge before it is too late.

The present rate of soil disappearance cannot be tolerated.

If it continues, Australia's position as a major food producer will soon be jeopardised.

Those gully washes clearly visible to motorists from major highways are only the tip of the problem.

Wind and water are removing millions of tonnes of soil a year from the nation's paddocks and most farmers don't even know it is happening.

The answer is better land management.

The Canberra-based National Farmers Federation (NFF), which represents 170,000 producers in all States, says about 40 per cent of the country now affected by soil erosion needs relatively simple treatment by methods such as trash and straw retention, grassing waterways and contour banks.

The rest requires more major soil surgery — gully dams, drainage works and control banks.

The NFF says farmers cannot be expected to carry the full financial burden of soil conservation.

It is extremely expensive, requiring the use of heavy earthmoving equipment.

The soil is the nation's most important resource.

Some agricultural practices in the past have speeded up the rate of soil erosion — for example, the cropping of unprotected hillsides, over-grazing and the over-zealous removal of trees.

But some agricultural practices, including the use of fertilisers, new pasture species and stubble retention farming, have aided soil protection.

Ironically, the much-criticised superphosphate subsidy to farmers is one of the keys to soil erosion.

Increased superphosphate usage encourages more grass to grow, which in turn protects the soil from the wind and rain.

But some short-sighted people don't seem to understand, much to the annoyance of the rural community.

The NFF says it is time Governments showed more leadership in the battle against soil erosion.

It says a joint State and Federal Government soil conservation study recognised in 1978 that the problem of conserving the soil was a community responsibility.

CSO: 5000

PEEL INLET, HARVEY ESTUARY NEAR 'ECOLOGICAL DISASTER'

Perth THE WEST AUSTRALIAN in English 7 Mar 81 p 16

[Article by Michael Sinclair-Jones]

> [Text] The cumulative effects of more than 20 years of environmental mismanagement appear to have pushed the Peel Inlet and the Harvey Estuary to the brink of an ecological disaster.

Four years of intensive studies of the two fragile wetlands systems have yet to reveal publicly the cause of massive algae growths that choke the waterways in hot, dry summers and kill thousands of fish and crabs.

Scientists already know that "algal bloom" occurs when the waters are overloaded with nitrogen and phospherous--nutrients that trigger rapid and lush underwater plant growth.

But there is no conclusive statement to show whether this is the result of farm fertilisers being washed into the waterways, septic tank seepage from waterside resorts or sluggish water caused by dams on the Serpentine and Harvey rivers.

The scientists blame the farmers, the farmers blame the dams and the conservationists and at least one local authority blame land development.

Stop-go

A stop-go attitude by the State Government and local authorities to big new waterside developments, proposed or under way, has further confused the issue.

While the Murray Shire Council is pushing strongly for a $500 million new deep-sewered resort town to be built on 1086 hectares at Point Grey, the Mandurah Shire Council has frozen all new big subdivisions till it gets State Government promises for deep sewerage south of the town for future settlements.

Last June, the Government announced a recently-extended six-months moratorium on all canal development after angering many local residents by approving a second such project near the Murray River. This project is now half-built.

It, too, will be deep-sewered, unlike the earlier Yunderup Canals development, which relies on septic tanks for effluent-disposal.

But the problem of septic tank seepage into the inlet continues at four other major developments on the inlet's west bank--Parkridge, Dawesville, Wannaup and Falcon--where a total of about 1000 homes have been built since the early 1950s.

Studies

The Mandurah Shire Council's moratorium on new subdivisions has been prompted by studies showing that it takes about 15 years for septic tank nitrates from these areas to reach the waterline.

The prospect that this pollution is now entering Peel Inlet is compounded by the fact that local government by-laws separating septic tanks from waterways are lax compared with those recommended by the Department of Conservation and Environment.

According to the Mandurah shire planner, Mr D. Caddy, septic tanks must be at least 1.2 metres above the highest known water line with at least a 30-metre foreshore reserve. This is increased to 50 metres if there is a road between the property and the water's edge.

But according to the department's booklet "Wetlands--guidelines for protection and management," a minimum setback of at least 100 metres should apply, with septic tanks at least two metres above the highest water table.

Despite these differences, scientists employed by the department believe that the major problems in the Peel Inlet and Harvey Estuary are caused by excessive use of superphosphate on rich farming land in the water system's catchment areas.

A major four-year study by the department due to be published later this year will include statistics to show that a total of 121 tonnes of phosphorus was washed into the two waterways in 1977-78.

Most of this came from heavily fertilised, irrigated dairy-farming land in the Harvey River catchment area.

'No Doubt'

One of the scientists in the study, Dr Ross Field, said last month: "There is no doubt that superphosphate is causing the problems in the water systems."

Since then, Dr Field has been gagged by his department and told not to talk to the Press.

The Mandurah shire president, Mr Dudley Tuckey, who is a farmer also, blames the damming of the Serpentine and Harvey Rivers for the clogged waterways.

"It is not wholly the fault of the phosphorus run-off and the sewerage," he said this week.

"Dams at Serpentine, North and South Dandalup, minor dams for headworks and railways and the new Wungong dam have combined to lower the flushing effect of the estuary."

The Waterways Commission, which holds the ultimate responsibility for the management of the waterways through the Peel Inlet Management Authority, admitted this week that it had few powers to protect the inlet and the Harvey estuary from outside influences.

"We have no authority to reject developments which we feel may affect the waterways," said the commission's secretary, Mr Colin Liddle.

"The Town Planning Board asks for comments on basic things such as the effect of new developments on water and we supply our advice."

Board's View

A spokesman for the Town Planning Board said yesterday that the board had no set policy on residential projects adjoining wetlands.

It was guided in its decisions by various consultant bodies, such as the Waterways Commission.

"We also consult local authorities--obviously we must take serious note of the views of the Mandurah Shire Council," the spokesman said.

"The board has been aware of the problem for several years but there has never been any conclusive evidence that septic tanks are the cause.

CSO: 5000

ALUMINUM INDUSTRY, BAUXITE MINING THREATEN ENVIRONMENT

Canberra Report

Perth THE WEST AUSTRALIAN in English 5 Feb 81 p 3

> [Text] Canberra: The Department of Home Affairs and Environment said yesterday that the potential existed for serious environmental impacts in bauxite mining, alumina refining and aluminium smelting.

The department made the point in a submission to the Senate standing committee on national resources.

It called for national integration of resource conservation and environmental objectives.

The department said that serious environmental problems were posed because of related energy developments, mainly coal-fired power projects to supply the massive amounts of electricity for the smelting process.

Environmental research and monitoring of existing and potential industry sites were principally State activities, with some Federal overlap.

Senator Michael Tate (Lab., Tas.) said that it was a shocking indictment of State and Federal ministers that environmental problems had not been looked at with a national view.

Fluoride

He asked why the Commonwealth could not, for example, impose fluoride-level regulations as prerequisites for the granting of export licences.

Mr Ken Thompson, first assistant secretary in the environment division, said that the Commonwealth certainly could take such action.

Earlier, Senator Tate had asked whether some State governments were conscious enough of environmental factors.

The departmental submission looked at environmental problems, ranging from the initial effects of open-cut mining of the ore to air and water pollution, land alienation and aesthetic and social impacts of rapid development.

Details encompassed disruption and what it called often irreversible effects on the flora and fauna of the mines and surrounding areas and effects on established industries, including silviculture, agriculture and tourism and erosion.

Other problems discussed were surface and underground water systems and noise pollution, water-pollution problems in specific areas such as the Darling Range in WA, and increasing soil salinity.

The department said that aluminium companies in Australia used the Bayer process, which produced a caustic redmud residue, impounded in big tailings dams.

These could be visually unattractive and presented potential problems with the discharge of excess contaminated water, affecting water quality and aquatic and marine biology.

Caustic fumes affected flora and fauna water-fowl attracted to the bigger water areas of the red-mud ponds could be killed.

The electrolysis of alumina in the smelting process involved emission of fluoride gas and particles, sulphur dioxide and dust.

Other pollutants were tars and coke dust, but fluoride was the most significant.

WA Disagreement

Perth THE WEST AUSTRALIAN in English 7 Feb 81 p 22

> [Text] The WA Government has dismissed as "pious humbug" a Federal department's assertion that the aluminium industry poses serious environmental problems.

It said that the department had expressed views that contradicted the policy of elected governments.

The Federal Department of Home Affairs and Environment made the point in a submission to the Senate standing committee on national resources.

It said that serious environmental problems were posed because of related energy developments, mainly coal-fired power projects to supply the massive amounts of electricity for the smelting process.

The Premier, Sir Charles Court, said that the submission was designed to provide the framework for Canberra to take over the States' responsibilities.

Potential

He said in a news release that WA had the potential to totally pollute the Swan River.

But in reality it had one of the cleanest metropolitan rivers in the world.

"So it is with the bauxite-alumina industry and so it will be with the aluminium industry," he said.

He said that WA had effective environmental controls based on scientific knowledge research and tested by highly qualified people for WA conditions.

It was absurd to pretend that Canberra bureaucrats would do a better job for the State.

CSO: 5000

AUSTRALIA

BRIEFS

SYDNEY AIRPORT NOISE--More than 100,000 people living and working around Sydney Airport are seriously affected by aircraft noise, some of it at levels dangerous to health, according to official documents. The documents, previously unpublished, include charts that show noise levels on the ground along the most used landing and takeoff paths vary from 89 decibels to 119 decibels. At 90 decibels, temporary hearing loss can be expected, and over time, permanent damage is possible. The sound generated at 110 decibels is equivalent to listening to a jackhammer from two metres. Fresh moves are being made by councils in the areas affected to force the Federal and NSW Governments to make an early decision on the future of the airport. The councils--which represent about 500,000 residents--are trying to break an impasse between the two Governments over Sydney's airport needs. The Premier, Mr Wran, rejected a proposal put forward by the Commonwealth that Kingsford Smith Airport should be extended, rather than a second airport be built. It is understood that if the existing airport is extended by the construction of a dual runway, more than 75,000 more people could be affected by serious noise. [By Tom Ballantyne] [Excerpts] [Sydney THE SYDNEY MORNING HERALD in English 14 Feb 81 p 1]

CSO: 5000

INDIA

HUNDREDS DIE OF LUNG DISEASE IN FACTORIES

Karachi DAWN in English 28 Feb 81 p 5

[Text]

LONDON, Feb. 27: Mrs. Indira Gandhi's decision to set up an alternative energy commission is being seen in some quarters as an acknowledgement that India's sophisticated nuclear power programme, with all its spin off industrial applications, might not be the only road towards the solution of the country's chronic ills.

Although India is the world's 10th largest industrial power, and has the third largest cadre of scientists and technicians, yet in the 85 slate pencil factories in Madhya Pradesh, hundreds of workers are dying from silicosis—a lung disease similar to but much deadlier than TB. Because factory owners say it is too expensive to install the dust-removing machines which the government had halfheartedly insisted on.

In the village of Multanpura, where 6 per cent of the slate pencil factories are located, there are hardly any old people and 12-year olds are forced into the factories to support their dying parents.

Conservative estimates say that over 2,000 people have choked to death in the mines and factories in the past 50 years, but few people have lived long enough to really know.

The glossy brochures produced by the Indian Atomic Energy Commission details the ways atomic research can be used in the treatment of cancer and describe the radiation sterilisation service provided to pharmaceutical manufactures. But in rural areas people are dying from the most basic diseases, and a village health worker may have only two hypodermic syringes to innoculate 21 people.

The stark contrast between the highly sophisticated technology of atomic energy and the widespread poverty and illiteracy makes India more vulnerable than most countries that are under attack for the development of nuclear power.

Critics ask whether the programme, which amounts for 10 per cent of the energy budget, is intended to bolster India's image in the eyes of the Western powers and fuel India's image as the most powerful non-aligned nation, with the option of building nuclear weapons.—PPI

CSO: 5000

INDIA

SCIENTIST MAINTAINS SEA AROUND INDIAN CITIES 'DEAD'

Bombay THE TIMES OF INDIA in English 5 Mar 81 p 3

[Text] Panaji, March 4 (PTI): The sea around cities like Bombay, Calcutta, Visakhapatnam, Madras, Cochin, Trivandrum and Ahmedabad is already "dead" according to Dr. Rashmi Mayur, director of the Urban Development Institute. He told a press conference here today that in India over 4.2 billion gallons of sewerage besides 150,000 tonnes of detergents were dumped every day into the sea.

Dr. Mayur asserted that 50 per cent of the sea around India would be dead by the end of the century if the present indiscriminate dumping of pollution was continued.

In Bombay alone 410 million gallons of sewerage, 80 per cent of it raw, was dumped daily killing marine life in a three-kilometre zone. In addition, many industries, some authorised and others unauthorised, were dumping their chemicals and other effluents in the sea, he said.

The city also dumped 3,220 tonnes of garbage to reclaim land from the sea--in the process ending the breeding grounds of the marine life, he said.

Dr. Mayur advocated a coastal settlement policy for the entire country and also a rational fishing policy to develop mariculture.

Research should be conducted to develop the desalination process so that sea water could be made available to the people for agriculture.

He also wanted the government to stop coastal erosion pollution by ships, protection of beaches, and fish life, exploitation of sea mineral wealth, development of water transport, creation of bio-medicine from sea vegetation, utilisation of tidal waves for energy, and development of sea-land communication.

CSO: 5000

AGRICULTURE, HEALTH STANDARDS AT STAKE DUE TO DEFORESTATION

Islamabad THE MUSLIM in English 28 Feb 81 p 6

[Text] KARACHI, Feb. 27: Air Marshal Inamul Haq Khan, on The Federal Minister for Housing and Water said here today that Pakistan has been selected for studies on mountain ecology, water management and environment at the South Asian countries Ministerial conference on environmental progress, which concluded in Colombo.

Talking to newsmen on arrival from Colombo at the Karachi Airport he said that the meeting expressed concern over growing deforestation in the Northern Areas of Pakistan and expressed the view that if not checked quickly it would affect the ecology of the country.

The Federal Minister said, the meeting was of the view that change in the ecological conditions, could have bad effects for the country's agriculture and also affect the health standard.

He said the participants told him that every effort should be made to improve the forestation in Northern Areas of Pakistan otherwise it would create problems for the country's economy.

The Federal Minister said the ministerial meeting emphasised the role of the governments, of the participating countries in improving the environmental conditions in their respective areas which would improve the living standards and economic conditions of their people.

He said the meeting first of its kind expressed the view that the governments of the region could co-operate with each other in the exchange of information on the subject.

Air Marshal Inamul Haq said good health and good environmental conditions were two key factors in any country's economy, because healthy people could produce more and they also minimise the expenditure on health which otherwise was being spent on the projects to provide medicare.

He said the developing countries need their financial resources for the development of projects in housing, industry and agriculture, but due to poor environmental conditions they were forced to spend a huge sum on medicare, which was a burden on their economies.

Inamul Haq said the participants of the Ministerial meeting noted this point with due emphasis, and urged the member countries of the South Asian countries environmental programme that they should pay due attention for the improvement of environmental conditions.

He said in the regard, it chose the Northern Areas of Pakistan to carry out research and other works to check the increased incidence of deforestation, which they feared may in future disturb the agriculture of the country.

The Federal Minister said during the Ministerial meeting it was unanimously decided to set up a permanent secretariat of the new organisation at Colombo.

The Ministerial meeting was attended by Iran, Bangladesh, Pakistan India, Afghanistan, Maldiv Islands and Sri Lanka. --PPI

CSO: 5000

PEOPLE'S REPUBLIC OF CHINA

DEALING WITH SHANGHAI'S POLLUTION, ENVIRONMENTAL PROBLEMS

Shanghai HUADONG SHIFAN DAXUE XUEBAO [JOURNAL OF EAST CHINA TEACHERS UNIVERSITY] in Chinese No 6, 1980, pp 9-14

[Article by Gao Weisheng [7559 0251 3932] and Jin Dingxin [6855 7844 7451]: "Finding the Subjective Causes and the Objective Solutions for the Pollution and Environmental Problems in Shanghai"]

[Text] For an environmental science worker who faces the increasingly serious environmental pollution problems, it is difficult to have peace of mind and not realize the overwhelming responsibilities. It is time that we have a sober understanding and anticipation of where the situation will lead us if the pollution continues its course in Shanghai, a city where millions of people work and live. Our objective is to work hard to develop production and to protect and improve our environment.

Current Condition of the Severely Polluted Huangpu Jiang

Man lives in the environment. The citizens of Shanghai, living in their specific environment, work and produce with the resources available to them. The annual production of Shanghai in industrial production alone amounts to more than one-eighth of the total national annual industrial production. Obviously, Shanghai is contributing substantially to our nation's four modernizations, however, are the citizens of Shanghai bestowed better working and living conditions because of the increasing amounts of wealth created by them? The answer is exactly the opposite. Friedrich Engels predicted a long time ago: "We should not be intoxicated with our victories over nature. For every victory we had, nature has had her revenge." Experience has shown that we suffered greatly in the end from the kind of leadership that was solely based on production considerations and ignored ecological considerations. What Shanghai citizens face today are the threats of millions of tons of sewage, dirty air, polluted soil and deafening noise. In the overall evaluation of man and his environment, we have finally awakened to the fact that while industry and agriculture have had continuous growth, the natural environment did not give us a break because we have a socialist system; it has quietly had its undiscriminating and relentless revenge on everybody.

The price of nature's revenge is enormous. The Huangpu River is such an example. This river originates at Tai Hu; it is the industrial and residential water supply of Shanghai and it is also a major channel for domestic and international shipping. If we follow the river from Dianfeng on the shore of Dianshan Lake west of Shanghai, the river flows through the six counties of Qingpu, Songjiang, Fengxian, Shanghai, Chuansha and Baoshan and the city of Shanghai and feeds into the Chang Jiang at Wusongkou, a total length of 114 kilometers. The Huangpu River has a total of 50 tributaries including major branches of Wusong Jiang (Suzhou He), Wenzao Bing, Gaoqiao Gang, Yangpu Gang, Hongkou Gang, Rihui Gang, Bailian Jing and Liulei Tang. The pollution of the Huangpu can be viewed as a microcosm of the severe pollution in Shanghai.

The pollution of the Huangpu began at its tributaries. Way back in the 1920's, the sprawling factories on the banks of the Suzhou River discharged industrial sewage directly into the river, turning it dark and smelly. From 1911-1914, the Zhabei water works was built on Hengfeng Road, supplied by water from the Suzhou River. By 1924, the water could no longer be used for drinking water and the water plant was forced to move to its present location on Jungong Road. After Liberation, the extent of pollution has continuously escalated along with the industrial development and all the branches of the Huangpu River have suffered pollution to one degree or another. About 10 branches, including the Suzhou River and Yangpu Gang have practically become open sewers containing dark, smelly bodies of water. The Suzhou River, except for the slight "improvement" downstream at high tide, is a black, stinking river all year around from the Jiangning Road bridge at midstream and up. At low tide the stream of black water threads its way through the downtown area, emitting a stink under the evaporation of summer sun and has greatly affected the environmental health and the esthetic appearance of Shanghai. Upstream pollution of the Suzhou has pushed its way from Huangdu, Jiading, to Zhaotunzhen in Qingpu county, a town 20 kilometers upstream. There are very few rivers in the world polluted to the degree of the Suzhou River.

The pollution of the Huangpu River has gone unchecked. The grave problem has been that the Huangpu is not only the principal water supply for Shanghai, it is also the city's biggest sewer. From Jingxing to Wusong, there are eight water supply plants interspersed with a number of municipal sewer pump stations, some of them very close together (for example, one of the sewage outlets of the Zhabei electric generating plant is only 40.5 meters from the intake of the Zhabei water supply plant. This has created a strange scene of crisscrossed water intakes and sewer outlets, and drinking water, industrial water and waste water are all sharing the same waterway, a phenomenon to be found nowhere else in the world. The daily discharge of industrial and residential sewage in Shanghai has now reached the 5-million-ton level. Out of that, only about 200,000 tons are treated, another 800,000 tons are discharged directly into the Chang Jiang and the East China Sea via two sewer pipes through the western and southern sectors of Shanghai. The remaining 4 million tons of unprocessed sewage are all drained into the Huangpu and its branches. In addition, more than a thousand tons of sewage and 350 tons of garbage are dumped directly into the river every day by the more than 4000 ships in the Huangpu. All the pollutants from the branches and the main stream have seriously degraded the water quality of the River. In the past, the Huangpu used to be a place where fish and shrimp swam and ships cast their shadow, now one can only see the floating oil patches and smell the stinking wind. Fish have long disappeared from the section of river winding through the city. In almost every spring and summer since 1964, there were at least 20-50 days when the Huangpu was dark and smelly. In 1978 it was as long as 106 days and even in 1979, when the precipitation was twice that of 1978 and a greater volume of water came down from up-stream, it lasted 99 days. During the irrigation season, the water volume from upstream is only 8 million tons per day while the waste water dumped into the river amounts to more than half that. As a figure of speech, when we drink a glass of water, about half a cup is processed sewage. The Huangpu water has a high phenol content; after chlorine disinfection, it has a distinct chlorophenol odor. The impurities in the water are very hazardous to industrial application and human health and the losses caused by them are hard to estimate.

Such actual situations and the harm they caused could not even be mentioned during the "gang of four" era. Whoever talked about them was "painting the socialist system black." In recent years newspapers and magazines have gradually exposed some of the problems. People often wonder why the government of capitalistic nations under media pressure and the capitalists' consideration for expansion and production needs, had to invest great amounts of money on environmental work and, after a period of time, could markedly change their badly polluted environments. In our socialist China, in a city of great production and pollution like Shanghai, why can't we put greater efforts into environmental work and change the present situation? Is the Shanghai environmental protection system to blame? No. Are the Shanghai regional party and political leaders to blame? Not entirely. Shanghai's citizens contribute more than 10 billion yuan to our national revenue every year. If the policy makers of the responsible departments in our central government still treat this grave matter affecting the livelihood of our people and nation lightly and [continue to] procrastinate, then, in the event of a "Huangpu River incident" or some other pollution incident, we fear that the aftermath will be unprecedented even if compared to the notorious eight large pollution incidents of the world,* or to the effects of a hundred "Bohai No 2" incidents. These are not just scary words. We are saying so only because we do not yet have a handle on the direct and indirect effects of Huangpu water on human health and on industrial and agricultural production (especially the effect of water pollution on the human body is not as fast as that caused by air pollution. Up to now, there are some statistical data only on the cancer morbidity and the mortality rate in Shanghai city. Statistics show that the incidence of various cancers in Shanghai residents had yearly increases and the rate in 1979 was almost twice that of 1963. Compared with seven other large cities including Beijing and Tianjin, the mortality rate in Shanghai is the highest.

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* The eight major pollution incidents are:
  (1) the Meuse River Valley smog incident in Belgium,
  (2) the Los Angeles photochemical smog incident,
  (3) the Donora smog incident in the U.S.,
  (4) the London smog incident,
  (5) the Yokkaichi asthma incident in Japan,
  (6) the Toyama cadmium contamination in Japan,
  (7) the Minamata mercury poisoning in Japan, and
  (8) the Japan rice-bran oil incident.

What if someday the Unangpu water becomes too polluted to drink, or some big incident occurs due to polluted water or polluted air? What kind of situation will we be facing? What four modernizations construction would we still have?

Finding the Subjective Causes of Increasingly Serious Pollution

It would not be easy to solve the host of problems of increasingly polluted Shanghai. First, one has to solve the ideological problems of the leading cadres both at the central government level and at the local level. For many years the explanation of what causes pollution has customarily been "the mess left by the old China" and "the crazed destruction by the gang of four." There have always been plenty of objective causes and rarely any investigations into the subjective causes. It seems now that there will not be a fundamental understanding of the importance of environmental protection unless we really get to the roots of the subjective causes.

Objectively, there did exist two things to be blamed for the Huangpu River pollution: one is the irrational industrial layout left by the reactionary imperialists, as evidenced by the pollution of such tributaries as the Suzhou River; the other is the disaster of the gang of four period that led to the peculiar dilemma of "industry going nowhere, pollution going everywhere."

The work of environment protection looks better now that the gang of four has been destroyed. But strangely, we have on the one hand environmental protection workers pleading for people's attention to deal with pollution and on the other hand pollution is going its merry way. Why? When people focus their attention solely on production and are irresponsible and ignore environmental protection, how can we expect the Huangpu River to clear itself up spontaneously?

Now is the time for us to soberly search for the subjective causes of the increasing pollution! There are many causes, but the basic reason is the long-term interference and damage of the economic realm by leftist thinking that accompanies backward scientific knowledge. Under the influence of such leftist thinking, people ignore the socialist objectives of production, pay no attention to the economic principles, and, in dealing with environmental problems, do not understand the dialectic relation between the environment and the economy. The attitude of only wanting high rates of economic development and not caring about spreading pollution and placing production above ecological considerations have finally led to the grave consequence of the environment taking revenge on the economy. The following are the manifestations:

(1) Environmental management was not included in the national economic planning. It takes money to deal with pollution and it takes great investments to manage the environment. If we are not determined to invest, the consequences are very

clear. It is only wishful thinking to expect to have great achievements with a minimum amount of investment.

In the 1950's, when environmental science was just emerging in other countries, we could get by by saying that we lacked the knowledge. In the 1960's environmental science made great strides and the environmental issue has become one of the four big contemporary issues.* In Shanghai, only when the pollution has threatened the fundamental living conditions of the entire population has some investment in pollution prevention and treatment been made. In the 5 year period from 1974 to 1978, allocations for dealing with the "three pollutants" in Shanghai amounted to a mere 1 percent of the city's capital construction investment. Many capitalist nations have funds for environmental improvement and protection that amount to a substantial percentage of their total investment for economic development. In Japan it is 7 to 9 percent. In the United States, the 17.5 billion dollars were spent from 1970 to 1976. In our case, environmental protection allocations were not even included in the national economic plan in the last 10 years or more. Since there was no specific source of funding, such strange phenomena as "emergency fund relying on the boss's signature" were taking place.

Shanghai needs substantial investments for its pollution problems, according to the estimates of the Shanghai Environmental Protection Bureau. To deal with the pollution of the Huangpu alone, three million-ton secondary sewage plants (with pipe systems) need to be built, with an investment of more than one billion yuan. In addition, 1.5 billion yuan are needed in pollutant treatment for old enterprises including relocation costs for those industries that cause severe pollution. These two items require about 3 billion yuan, an amount clearly impossible for the local level to come up with. The fundamental problem cannot be resolved unless there is a definitive allocation for such funds.

(2) The results of unplanned direction over the years have heightened the irrational industrial structure and layout in Shanghai.

Shanghai is the largest industrial city in China; it is a mixture of feudalistic and colonial characteristics and has interspersed factories and residential housing. After Liberation the original layout was rearranged according to socialist production principles which were supposed to make things more reasonable and reduce the environmental pollution. But in actuality, expansions were made after Liberation based on the old illogical layout. Although a few satellite towns were gradually established in the suburbs after the announcement of the "utilize fully, develop sensibly" policy in 1956, but in the city, "filling in all the gaps" was stressed and some existing buildings and residences were even converted to new factories. Thus, some factories and industries that are totally unsuitable for urban areas have gradually taken shape and further developments led to the intricate scene where factories are surrounded by residences and residences in turn are surrounded by factories. The illogical layout became even more irrational, and the resulting pollution incidents, involving not only water but also air, soil, and noise, are too numerous to count. For example, in the 60-hectare area of West Baoxing Road, Zhongshan North Road, New Republic Road and Liuying Road is a concentration of more than 50 hazardous plants and, interspersed with them, some 2000 residences. Exhaust gas, smoke, dust, and sewage are discharged at will. According to measurements, the dust fallout level in this area exceeds the health standards by 3-8 times, the level of poisonous gases such as SO_2, H_2S and HCl are tens or even hundreds of times higher than the emission standards and the phenol and mercury levels in the sewage are several hundred times above the allowed waste water emission standards. Cromium contained in the sewage also exceeds the emission standards by almost 30 times. Human health is severely affected in this area. Among the students of the local high school, 60.8 percent have chronic rhinitis and 34.9 percent suffer from chronic inflammation of the throat.

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*Resources, population, environment and economic development.

The irrational industrial structure of Shanghai has left little maneuvering space for urban improvement and has intensified urban pollution. With an urban area of only 114 square kilometers, Shanghai has highly concentrated industries and a population density among the highest in the world for cities of its size. It is congested even in the suburban areas. With these characteristics, one would expect the economic planning for Shanghai to call for low-pollution, high technology projects that do not require a lot of land. However, the various industrial ministries of the central government, using low investment and fast returns as justifications, are trying to achieve much new construction and expansion of factories in Shanghai. The Baoshan steel mill is such an example. Baoshan is the largest industrial investment since the Revolution and its success or failure is no doubt a national focus of attention. However, as it turned out, the Baoshan steel construction project was started in a hurry and many things were not taken into consideration due to carelessly performed preparatory planning. Take environmental protection, for example. It is not as trouble-free as originally advocated. According to reports on preliminary estimates, when the entire Baoshan steel mill is put into production the SO_2 emission will be about 9 tons per hour, or 216 tons per day, equivalent to one-fourth the total current SO_2 emission of the entire city. Baoshan steel plans to release its waste gas through 200 m stacks; but at this height it is estimated that the high altitude constant wind speed will cause most of the pollutants to fall in the downtown area south of Hongkou if the pollutants are not eliminated first. If a large industrial enterprise such as Baoshan steel is still to be a major part of the Shanghai area industry and is expected to cause severe pollution to the area, has the responsibility to the 10 million residents of Shanghai been taken into consideration? Over the years a lot of heavy, bulky industrial products, even their preliminary processing, have devolved on Shanghai. For instance, radioactive rare earth ore was brought into Shanghai for coarse refining and has left a lot of radioactive waste that had no place to go. The paper industry brought wood and herbage from their locality into Shanghai for pulp production and generated large amounts of waste water. All these have made the urban pollution problem even more acute.

(3) The environmental protection agencies were not given the proper authority in time. In many industrialized nations, environmental impact evaluations

are required before a new construction project gets underway and the environmental protection agencies are authorized to provide crucial opinions concerning the permission or denial of an engineering project. Our environmental agencies have long lacked this type of authority. Before the Environmental Protection Act was passed, it was said that: "The environmental protection officials are in charge of the sky above you, the ground under you and the air in between; but what they say ain't worth a damn." Although the situation differed from place to place, it did exist. In an attempt to effectively control pollutants, the Shanghai environment protection bureau has repeatedly suggested economic measures and the adoption of a pollution fine scheme proven to be effective in foreign nations. But their proposals, albeit beneficial to the nation and the people, consistently failed to gain support and approval before the environmental act was passed. Some people, it has been said, thought such fines were "rocking the boat of socialism." With such people totally ignorant of the content and meaning of environmental protection, how can one expect sound progress of environmental protection work?

In recent years everyone has heard about the importance of dealing with the "three pollutants," but it still receives no proper attention in actual practice. One distinct example is demonstrated in the lack of the "three pollutants" emission standards among the evaluation items of factories and industries. Now that there are no formal, strong administrative directives, many factories irresponsibly dump pollutants at will. Based on statistics of the past 10 years, assuming a constant industrial structure and an annual increase in production of 8 percent, the increase in waste water alone is about 150,000-200,000 tons per year. The consequences are unthinkable if the waste water dumping is not controlled and treated. After fighting for their cause for many years, the environmental agency has finally prevailed and, starting 1 September 1980, Shanghai has begun assessing pollution fines. This is, of course, not the final solution. The ultimate solution is in the management of the environment. But for the time being, enforcement of the environmental control regulations is an urgently needed and effective means to check the further escalation of pollution.

(4) Environmental education has not been conscientiously promoted and publicized. To the question of whether it is better to expose the problems of pollution or to evade them and cover them up, our answer is that it is better to expose them. To really expose the problems is to trust the public. The public understands the situation our nation is in and can accept the fact that our nation cannot immediately come up with huge investments to improve the environment. But being poor is no excuse for being lax on the criticism and exposure of bureaucratism. Corruption and waste are grave offenses; how can we let irresponsible polluters go scot-free? Even after the Environmental Protection Act was announced, people still have this nagging worry about whether it can actually be throughly carried out. For example, even though the "three simultaneous" policy* was clearly

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*The "three simultaneous" refers to the simultaneous design, construction and operation of environmental protection facilities with main-body engineering projects.

specified in the national regulations, an investigation in Shanghai has revealed that out of the 588 new construction, expansion and revision engineering projects approved in the years from 1974 to 1977, only 40 percent are really adhering to the "three simultaneous" policy and 10 percent are not practicing it at all, including some major construction projects like the half-chain rolling mill of a certain steel mill and a certain power plant. It is clear that pollution still cannot be controlled merely by implementing some policies but not publicizing the importance of these policies and carrying out the policies with determination.

We cannot be satisfied with the promotion scheme of tidbits of expose in the newspaper and studies by some scholars. To publicize environmental protection work we need loud appeals to the public by all the news media including radio, television and newspapers to make people understand that this issue is really directly revelent to their personal well-being. For example, the industrial "four hazards" (exhaust gas, waste water, solid waste and noise) cause almost a hundred incidents every year that lead to conflicts between factories and residents and result in damaged facilities and plant buildings and bodily injuries. The consequences are losses of manpower, material and money suffered by both sides. Such incidents cannot be avoided with administrative directives alone, it takes effective publicizing, elevated culture and moral standards, and initiative in self-control and management. Therefore, publicity itself alone will only serve a management function.

Pollution Management Should Follow Objective Rules

Environment management is a broad field that requires systematic planning. There should not only be a set of regulations, but a serial of system engineering must also be put on solid basis as well. In this respect, one has to follow objective rules and not subjective arbitrariness.

Firstly, there should be a set of well-defined practical objectives. Practicality is especially important here. The preliminary assumption for Shanghai is "to control pollution in 5 years, to make every effort to improve the environment and gradually reduce the pollution in the Huangpu. Within 10 years, there should be substantial improvements and the Huangpu should be restored to its 1963 condition, that is, no longer black and smelly so fish can live in it again. In 20 years, ecological equilibrium should be reached and Shanghai will become a socialistic new city with a pleasant, clean and quiet environment." The first stage of the scenario seems practical enough, but in 10 years and 20 years, what subjective conditions are these goals based upon? How much manpower, material and money are required to achieve these goals? How will the people's understanding and commitment on environmental management be estimated? Is it valid to assume that the partial successes in the pollution fine system and sewage engineering imply that water in the Huangpu will soon become clear? Is it really that simple? We believe that these objectives must be publicized and explained to the public to form strong public opinion pressure and in the meantime put investments and concrete measures on a solid basis. Publicity aimed at the masses must be strengthened to elevate the moral and culture level. Only then are we providing solid ideological and material bases to achieve these goals.

Secondly, we must be determined to carry out the Environmental Protection Act thoroughly. For the Shanghai area in particular a great effort must be put into establishing a rational industrial layout. The improper practice of replacing pollution treatment with pollution imputation must be strictly forbidden. In the industrial development of Shanghai, in the employment of the intellectual youths and in the development of collective enterprise and business, many Shanghai plants and factories have transferred their three pollutant products to communes, brigades and community production units. This practice of transferring polluting factories to the countryside will produce gross consequences. Let us look at the situation of electroplating. At present there are plans for reorganization in electroplating according to the specialization principle, but some communes and teams are developing electroplating and are dumping their waste water from electroplating directly into the neaby rivers and streams. Shanghai county has been monitoring the water quality and found pollution in 96 percent of their surface water test points. Water at 25 percent of the test points is no longer drinkable. All the polluted bodies of water finally end up in the Huangpu. Thus, polluting sources are spreading while attempts are being made to clean up the Huangpu. This has no doubt made things even more difficult.

Thirdly, the work of environmental monitoring and environmental quality evaluation should be strengthened. The importance of environmental monitoring goes without saying. The proper anti-pollution measures can be taken only after we have an overall scientific understanding of the pollution conditions. Blindly adapting unscientific practies will lead to no useful results. From the viewpoint of reorganizing the industrial layout in Shanghai, the choice of the Wusong industrial zone seemed to be a reasonable one considering its geographic location and the technological and economical conditions. However, after this industrial zone was formed, environmental test results indicate that, due to a lack of anti-pollution measures, thick smoke rolls up into the sky all day long and the area's water, atmosphere, and soil are all severely polluted. According to the 1977-1979 statistical data of monitoring and analysis, 214 million tons of waste water are released by more than 30 factories in the area, and 990,000 tons of waste gas and 650,000 tons of solid wastes are released per year. Through composite analyses of the hazardous material emission, heavy metal contamination in the soil, and pollutants in the air and water, one obtains the following preliminary picture: The zinc content of the soil in this area is generally high and there is obvious zinc contamination. There are many cadmium contamination spots but the situation is generally not serious except at isolated points. Fluorine has had noticeable effects on the growth of live-stock and cereal plants, the reduction in rice yield is most pronounced. Arsenic contamination is the lightest and at only a few places. Mercury contamination is extremely serious but only at very localized spots. Chromium contamination is more pronounced and has had adverse effects on crops. There is no obvious manganese contaminzation except at isolated spots. Based on this type of scientific analysis, anti-pollution measures can be suggested to the major polluting units such as the Shanghai Steel Mill No 1, the Shanghai Steel Mill No 5 and the Shanghai Sulphuric Acid Plant so that the pollution hazard in the area can be greatly reduced. Suggestions and priority judgments based on the monitoring analysis and evaluation research are objective and scientific. With the same amount of investment, one can expect much more favorable results as compared with that of blind investments.

Fourthly, scientific research must be conducted for major anti-pollution engineering projects and many proposals should be developed and compared. The pollution situation by the "four hazards" (the three pollutants plus noise) in the Shanghai area is extremely complex; therefore, different opinions and proposals for anti-pollution practices should be allowed to compete openly. Our nation can no longer afford to have hundreds of millions of dollars going down the drain as "tuition."

Anti-pollution engineering must have its order of priorities and the current emphasis of solving the pollution problems of the Huangpu is properly placed. In view of the complexity of the Huangpu pollution situation, a Huangpu anti-pollution management committee should be established as soon as possible and a complete project similar to the Apollo project should be institutionalized and carried out. Once the overall objectives are clearly defined, the project should be divided into several stages with definitive goals for each stage. After a thorough analysis of the subjective and objective conditions, solid progress can then be made.

Competition among proposals should be encouraged. Our problem now is a lack of proposals. In the case of sewage engineering, the discussions over the years have been centered around the debate of concentrated or diffused discharge and the choice of a water body for the discharge. The repeatedly discussed and gradually formed proposal of concentrated sewage treatment does not appear mature enough for engineering design and construction. For example, the proposal has yet to come up with a suitable and practical solution for the sludge treatment problem. This matter cannot be taken lightly--what shall we do with the tens of thousands of tons of sludge per day (!) in the future? The sludge produced by the 60,000 tons of sewage from the Shanghai Jingshan Main Petrochemical Plant every day, as the authors have witnessed, all needs to be accumulated to await a better solution. One can thus imagine the serious problems of dealing with the sludge from millions of tons of sewage every day. As for the idea of transporting the sewage through pipes and then diluting it with the great volume of Chang Jiang water, we feel that there may be certain worrisome aftermath in the long run. Location-wise, Wusong Kou is at the tide entry point of the Huangpu and is situated downstream to the proposed sewage plant; thus, even though the subjective idea is to dilute the sewage in a great body of water, the objective condition is that the Chang Jiang estuary has tides and sewage cannot be released 24 hours a day, at least not before the sewage plant is completed. This would force the prior construction of a regulating reservoir and a great amount of associated facilities, and it would also mean dealing with problems of sewage precipitation. The situation will soon become more and more complex. Moreover, no matter which proposed sewage engineering plan is finally chosen, the first order of business is to solve the sewage collection problem. What if the hazardous factories, like the diffusion of cancerous cells, spread towards the suburbs where the sewage pipes cannot reach? Then what do we do?

For any proposal, in depth investigations must be made based on considerations for a greater area and for ecological equilibrium. This involves a fundamental viewpoint, that is, whether the anti-pollution management of the Huangpu is equal to the sewage management of Shanghai city. Our understanding is that solving the Huangpu pollution problem should be viewed as dealing with all the pollution sources of that river. Since the root of the problem is the pollution sources and the sewage engineering of Shanghai cannot possibly solve the problems of all the pollution sources, the Huangpu Jiang problem is really encompassing a greater area. For example, external (from adjacent provinces) sewage polluting Dingshan Lake is a threat. On the other hand, if Huangpu Jiang is cleared up but the Chang Jiang and the coastal area at East China sea become polluted, that may also be the ensuing consequence. All these considerations are calling for some careful ecological and economical studies and comparisons of a number of proposals before a final optimum decision is to be made.

In the decision making process of any major project, the opinions of all those involved should be consulted. We should make use of the merits of different proposals and go over the various plans repeatedly to evaluate them. Once the decision is made and the plan is finalized, it should be carried out with all the vigor and swift. This approach is consistent with both the objective conditions and the active human nature, the promotion of environmental protection should undoubtedly be no exception to that.

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FISHING RESUMED OFF PORT KAISER AFTER SHELL OIL SPILL

Kingston THE SUNDAY GLEANER in English 1 Mar 81 p 2

[Text] Fishermen in Alligator Pond and adjacent fishing villages on the coastline near Port Kaiser, St Elizabeth, put out to sea again and public health inspectors stopped dumping fish with the lifting yesterday of the ban on the catching and selling of fish in those areas.

The ban was imposed on Wednesday by the Government as a precaution to protect the fishing communities around Port Kaiser after the Shell tanker Erodona ran aground and damaged its no 1 oil tank spilling 15,000 gallons of oil near Port Kaiser on February 21.

Compensation

The Shell Company (W.I.) Limited used a dispersant called Corexit to break up the oil slick, but Government expressed fears that the chemical was toxic and instituted immediate emergency measures including the ban on fishing, catching and vending, to prevent a possible threat to human life.

A Management Committee set up by the Government to investigate the oil spill and its effects, announced yesterday that the ban was no longer necessary and the Government was satisfied that the dispersant would not affect the health of the people.

The Committee headed by Mr Allan Isaacs, Special Adviser to the Prime Minister, met at Jamaica house yesterday and reviewed the effects of the oil spill and the use of the dispersant. In a statement later announcing its decision, the Committee said that Shell Company had agreed to compensate the fishermen for loss of equipment and earnings between the day of the oil spill and Wednesday, last week. Details of the compensation are to be worked out.

The Harbour Master's Department is conducting an investigation into the accident. The Erodona which was carrying 6.5 million carrying gallons of bunker fuel at the time of the accident, has since been refloated. The incident led to the dumping of thousands of pounds of fish as a precautionary measure.

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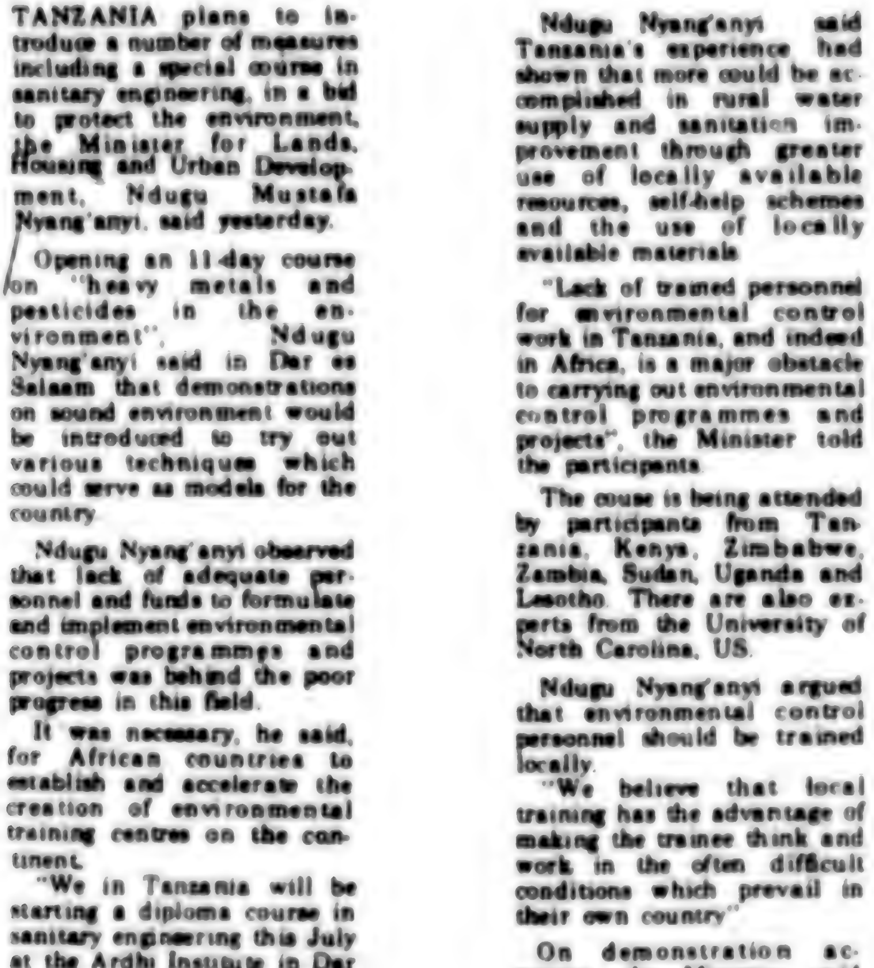
AFRICAN ENVIRONMENTAL CONTROL COURSE HELD IN DAR ES SALAAM

Course on Heavy Metals, Pesticides

Dar es Salaam DAILY NEWS in English 10 Mar 81 p 3

[Text]



TANZANIA plans to introduce a number of measures including a special course in sanitary engineering, in a bid to protect the environment, the Minister for Lands, Housing and Urban Development, Ndugu Mustafa Nyang'anyi, said yesterday.

Opening an 11-day course on "heavy metals and pesticides in the environment", Ndugu Nyang'anyi said in Dar es Salaam that demonstrations on sound environment would be introduced to try out various techniques which could serve as models for the country.

Ndugu Nyang'anyi observed that lack of adequate personnel and funds to formulate and implement environmental control programmes and projects was behind the poor progress in this field.

It was necessary, he said, for African countries to establish and accelerate the creation of environmental training centres on the continent.

"We in Tanzania will be starting a diploma course in sanitary engineering this July at the Ardhi Institute in Dar es Salaam", he said.

Ndugu Nyang'anyi said Tanzania's experience had shown that more could be accomplished in rural water supply and sanitation improvement through greater use of locally available resources, self-help schemes and the use of locally available materials.

"Lack of trained personnel for environmental control work in Tanzania, and indeed in Africa, is a major obstacle to carrying out environmental control programmes and projects", the Minister told the participants.

The couse is being attended by participants from Tanzania, Kenya, Zimbabwe, Zambia, Sudan, Uganda and Lesotho. There are also experts from the University of North Carolina, US.

Ndugu Nyang'anyi argued that environmental control personnel should be trained locally.

"We believe that local training has the advantage of making the trainee think and work in the often difficult conditions which prevail in their own country."

On demonstration activities, the Minister said these would go hand in hand with research activities.

"However, the field of research activities is usually very wide, ranging from the most simple research to the most elaborate, according to the prevailing possibilities.

"The important thing here is that our scientist especially those of Africa should not let themselves be discouraged by the word research, since the development of certain actions, tools and methods — even the most simple — may have an unexpected human impact", he said.

Ndugu Nyang'anyi added: "Traditional research methods should not unreasonably be continuously used: on the contrary, modern techniques and methods should be tried out to enable us to solve our environmental problems rapidly and economically.

"There are no short-cuts to success in dealing with Africa's environmental problems and it is the task of us all to steadfastly and diligently to continuously seek solutions that are sound and realistic for each problem".

The Minister asked environmental control workers to develop a multi-disciplinary concept, and to enlist the support of others in society.

In a presentation of "the legal and political aspects of pollution control in Africa", the Government Chemist, Ndugu Pusani Juma Madati, said the biggest problem facing many countries, including Tanzania was that there were plenty of laws of environmental protection but which remained unsupported by enforcement programmes.

Firm Pollution Policy Needed

Dar es Salaam DAILY NEWS in English 11 Mar 81 p 1

[Editorial]

[Text]

THE on-going two-week course on "Heavy Metals and Pesticides in the Environment", yesterday pointed to the dangers of ignorance in handling just about everything you can think of our surroundings.

For instance, thousands of people are known to have been poisoned by pesticides throughout the world. This mishandling of pesticides can be fatal when accidentally incorporated into foods.

In Tanzania, this observation can be a great eye opener to what is going on around. We live in a world where chemicals can easily be mistaken for some edible stuff.

The course has also pointed to the disastrous effects caused by ignorance of the danger warnings that are put on chemical containers.

One has just to go to the fish market, grocery stores and butcheries to find out the kind of materials used to pack purchased items.

In most cases, you find that old plastic bags have been emptied of their chemical contents and the customer unquestionably buys them to carry food home.

This is extremely dangerous. There is a case for looking into the whole situation with greater concern. Just about every Tom, Dick and Harry is now engaged in the business of making one form of packaging materials or another with the least regard to its potential dangers to health.

Cement bags and you name it, are a commonplace even at our relatively respectable super markets. They are used for carrying sugar, rice, bread and other groceries.

The problem, of course, is that we have yet to establish any standards for packaging materials. And with the rampant shortage of paper, the dealers have resorted to using gift wrapping paper for purposes likely to endanger people's health.

Even more serious is the pollution resulting from our industries, which are invariably badly located and which more often than not operate without strict environmental controls.

A number of our industries expose their workers to all sorts of dangers. In some industries, it is not unusual for workers to handle dangerous chemicals or materials without protective devices.

The whole situation cries for serious concern for the protection of our environment and overall people's health.

Public awareness for all these seemingly unknown hazards has to be developed. The authorities concerned must not be allowed to close their ears to cries for a firm pollution control policy.

CSO: 5000

SURVEY SHOWS POLLUTION SERIOUS IN CAPE AREA

Johannesburg THE CITIZEN in English 17 Mar 81 p 13

[Text]

A R13 000 air pollution survey commissioned by the Cape Town City Council has shown that air pollution in the peninsula is worse than any other centre in South Africa — and even worse than industrial Tokyo.

Hundred of tons of pollutants are spewed out daily by power stations, motor cars, coal fires, locomotives (mainly in the docks) and industrial processes.

The survey, conducted over a five-year period and completed recently, warned that:

- Air currents which occur over the planned Koeberg nuclear power station can bring emissions into the city and in certain weather conditions keep them circulating there.
- Photochemical smog — an invisible form of air pollution caused mainly by motor car exhaust gases — is on the increase and is now greater than that experienced in Tokyo — one of the world's most polluted cities.
- The operation of Table Bay Power station will under certain conditions bring back the situation in the early 70's when city women had their pantihose burnt and office notepaper turned blue with sulphuric acid fallout.

The report, in five volumes, was compiled by University of Cape Town pollution experts Duthkiewicz, Professor R Fuggle and Dr C S Keen.

The survey found that the Table Mountain crescent containing the central city area tended in certain weather conditions to act as a "pollution sink" in which pollutants were concentrated. Winds from the Northern coastal zone, in which the Koeberg nuclear power station is situated, could also recycle the day's emissions back over the station and send it circling back towards the city.

One of the findings was that photochemical smog, an invisible form of pollution caused by the interaction of sunlight and mainly car exhaust gases, had reached levels higher than that of Tokyo.

The report found that under certain weather conditions the smoke plume from the Table Bay power station would not disperse and could exceed "maximum acceptable levels" of air pollution in the upper areas of the city centre.

Given similar conditions, dust, sulphur dioxide, and nitrogen oxide levels could be "higher than average" south of the oil refinery and fertilizer plant north of the city at Milnerton.

The total dioxide was 40t a day, of which 62 percent came from coal burning and the total amount of a particulate (dust) was 197t a day - 90 percent from coal.

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NUCLEAR PLANT THERMAL POLLUTION PUT TO PRACTICAL USE

Paris CEA NOTES D'INFORMATION in French Dec 80 pp 3-10

[Article: "Pisciculture, Early Products and Forced Culture; Examples of Exploitation of Waste Waters of Installations of the CEA"]

[Text] All human activity is represented by a degradation of noble energy into heat at low temperature. There are massive natural sources such as deep layers of water and geothermal waters plus artificial sources such as the waste products from certain industrial processes, in particular classical heat generating stations and nuclear power plants.

These installations have outputs on the order of 30 percent. In order to transform heat into work, it is necessary to have a hot source and a cold source and for each kW usable in electric form, about two are transferred to the "cold" source in the form of heat at low temperature.

The increase in energy demand leads to an increase in the production of low calories (1).

In the industrialized countries, the portion of energy of nuclear origin increases in the distribution of energy resources, and numerous nuclear power plants give off large quantities of slightly reheated cooling waters.

It has long appeared useful to promote the use of tepid water produced by the power plant since this utilization may be conceived as a means of diminishing the need to resort to primary energy (petroleum, gas, etc.) in installations that use it for heating and also as a means of improving the economic profitability of certain agricultural or piscicultural operations, for example.

We have presented two examples of applications here.

Growth of the Eels

By the year 2000 the world population will have doubled. It will no longer be possible to satisfy the estimated demand for seafood (16.2 kg per year and per inhabitant instead of the current 11.8) by conventional resources. According to the experts at the FAO (Food and Agricultural Organization) the development of aquiculture could remedy this shortage of proteins of aquatic origin. They feel that it is possible to multiply the aquicultural production tenfold between now and the end of the century, to bring it to a tonnage equivalent to that of the present aquatic harvests, i.e., about 60 million tons. This future development of aquiculture could be achieved through two lines of approach: increasing the areas dedicated to aquiculture from 3-4 million hectares to 30 million hectares and applying new breeding techniques.

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(1) Low calories: those included between the "room" temperature (about 15°C) in which we live and 100°C.

Tests on the breeding of aquatic animals in waters reheated by the power plants have been the subject of studies for some time in Japan, the United States, and Europe. France, which arrived on the scene late, has carried out tests focusing on the breeding of different species: sea-perch, chrysophrys, shrimp, sturgeon, carp, and eels in particular.

The work of the Department of Studies and Research on the Environment (SERE) of the IPSN at the Nuclear Study Center of the CEA at Cadarache dealing with the use of reheated water for the enlargement of eels was begun in 1974. The results obtained since that time have made it possible to develop a large-scale installation that has now reached the industrial stage at Pierrelatte.

The deliveries to the markets of Rungis, at Lyon and abroad, first began at the end of 1979. The total production should be 80,000 kg by 1981.

Numerous laboratory studies have shown that within certain temperature limits warm waters have a beneficial effect on the growth of fish. In addition Gribanov (1968) showed that the optimum growth for the carp occurred between 23 and 30°C; for the catfish, it would be close to 32°C according to Andrews (1972) and Kilambi (1974). It would only be 13°C for the spring-water charat according to Mac Cormick (1972). Querellou (1974), citing Matsui, estimated that the Japanese eel (Anguilla japonica) would develop the best at 25°C, while the European eel would be content with 20 to 22°C.

Although the advantage of using warm waters in aquiculture has been known for some time, up to the present any attempts at application have come against the prohibitive costs of heating the water.

For about a dozen years, the development of nuclear programs in the major industrialized countries has had as a consequence the discharge of enormous masses of warm water. It should in fact be pointed out that a nuclear power plant of 1,000 electric megawatts gives off about 50 m^3 of water per sec with an increase on the order of 10°C with respect to input water drawn from rivers, lakes, or the sea, the use of these warm waters for piscicultural purposes being particularly advantageous in the cold and temperate regions.

The eel chosen for the first test has been the subject of research in Japan, where there has long been a traditional anguilliculture. In Europe the research has been almost nonexistent, although the shortage of eels has been estimated at 10,000 tons (1976). Along with Denmark and Italy, France is one of the main producers (through fishing) of eels with about 4,000 tons. An analysis of the fish carried out on behalf of the principal eel operation in France (900 tons) showed that 45 percent of the tonnage (80 percent of the total) consisted of eels smaller than or equal to 50 g in weight. Economically, we may clearly see the advantage that there might be in exporting not 50 g eels (France exports at least 80 percent of its production) but 150-200 g eels that go for triple the price. It has been estimated that the quantity of the potential European market (30,000 tons) could rival the top European breeding fish market, that of the trout.

The tests conducted have made it possible to provide specific data on the growth possibilities of the eel in a body of water with a temperature stabilized at 20 ± 2°C. Based on data related to growth according to sex, the possibilities that these tests may provide at the production level have been determined.

The First Tests Conducted by the CEA

During two tests conducted at the Center of Nuclear Studies of Cadarache, the one 18 months ago and the other 25 months ago, the beneficial influence on growth of an increase in water temperature was confirmed. In these two experiments, the researchers were concerned with comparing the growth of a control lot (undergoing seasonal fluctuation--between 6 and 19°--in temperature) with the growth of an identical lot placed under more favorable temperature conditions.

During the first experiment, the temperature was kept constantly at 20 ± 2° (i.e., close to the optimal growth temperature of the European eel). The average weight of the eels went from 30 g to 210 g in the experimental basin, while it only reached 90 g in the control basin.

Table 1. Distribution of the First Fertilization Cycle of the Industrial Production Unit

Date	Input (kg of wild eelworms)	Output (kg of marketed eels)
April 1979	8,700	
August 1979	3,000	
February 1980		6,500 (100 g eels)
		2,700 (50 g eels)
April 1980		3,700 (25 g eels)
		2,500 (50 g eels)
July 1980		2,800 (25 g eels)
		1,000 (50 g eels)
	11,700	19,200

During the second test, the temperature remained within about 7° as compared with the control, i.e., it was attempted to test conditions similar to those that would exist if we were to use cooling waters from power plants.

The average weight growths are 12 g-200 g and 12 g-65 g, respectively.

To these 19,200 kg sold as pre-enlarged eels or eelworms (conditioned to inert food), we must add the production of four basins whose total biomass was 7,500 kg in February 1980. These eels were marketed at the end of 1980 at an average weight of 150 g.

Some 12,000 kg of wild eelworms were introduced to the pisciculture operation in June and July 1980 for the requirements of the second fertilization cycle.

These results made it possible to develop a larger-scale installation, the industrial pilot at Pierrelatte designed to offer elements indispensable to the creation of an industrial type operation.

It was possible to set up this industrial pilot, at the initiative of the Radioecology Section, thanks to the cooperation of four participants:

--the group of eel exporters of Perols Languedoc in Herault, which is professionally interested in controlling the growth of eels, has assured the operation of this pilot;

--the Radioecology Section has lent its scientific and technical assistance and its financial support to this operation of economic feasibility demonstration;

--Cogema (2) provided the grounds necessary for starting the pisciculture operation and the warm water from the refrigeration circuit of the Pierrelatte isotopic separation plant;

--the Agency for Energy Savings, which provided financial aid in the form of a subsidy. In the case under consideration, the energy savings is determined in relation to a piscicultural installation that is comparable but that would have to reheat its water in order to achieve the same results. It is the CTGREF (3) that played the role of Counsel for the Agency.

The pilot installation work first began in March 1978 and the first use of the basins took place in May 1979.

GEAL (4), which has assured the pisciculture operation, essentially took charge of: supplying the original eels, i.e., about 12 tons of 10-15 g eels; feeding them (purchase of flour, preparation and distribution of the dough); sorting them during breeding (separation of the eels characterized by different rates of growth); harvesting them and marketing them.

The scientific and technical assistance assured by SERE consisted of advising GEAL in particular in the areas of growth, feeding, quality control of the water, and monitoring of the health of the fish, as well as of making available during breeding its calculation and analysis capabilities.

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(2) Cogema is a 100 percent affiliate of CEA.

(3) CTGREF: Technical Center of Rural Water, and Forest Engineering.

(4) GEAL: Eel Breeders Group of Languedoc.

The first significant findings were presented at the beginning of 1980 and led to the putting in operation of the industrial production unit.

Table 2. Aquiculture in Reheated Waters in France

Organisms	**Source of the waters**	**Characteristics**	**Species bred**
CEN of Cadarache	**Classical boiler**	**Experimental tests in concrete basins**	**Eel**
COGEMA **CEN of Cadarache**	**Pierrelatte isotopic separation plant**	**Pisciculture integrated with a 9 basin agro-piscicultural complex on the ground (2,700 m^2)**	**Eel**
EDF **Aquamarine Management**	**Ponteau-Martigues classical heat generating station**	**Experimental tests on seawater (basins)**	**Sea-perch, chrysophrys, shrimp**
EDF Aqua Division	Saint-Laurent-des-Eaux nuclear power plant	Experimental tests and production basins	Carp, eel
EDF CTGREF	Classical heat generating station of Ambes	Experimental tests in brackish water	Trout, eel
EDF Dunkirk urban community	Gravelines nuclear power plant	Project (in seawater)	Japanese shrimp

Table 3. Data on the Relative Accomplishments With the Use of Warm Water in Pisciculture. World (except Japan)

Country	Source of waters	Species	Remarks
West Germany	CHGS Niedetaussem	carp eel trout	1976 production, 5 tons 22 basins
	CHGS Emder	eel carp trout	Experimental in brackish water
East Germany	CHGS Berlin	carp	Commercial in cages
England	CHGS Ratcliffe on - Sear	carp and eel	Experimental

[Continued on following page]

Country	Source of waters	Species	Remarks
Belgium	NPP Tihange	tilapia eel	Basins on ground 50 m^3/hr Forms part of a whole (horticulture-algae)
Canada	NPP Picketing	trout	Immense project 12,000 t/yr
Scotland	CHGS Hunterston	plaice-sole turbot-limanda	Aquicultural farm in seawater. Basins and floating cages 200 m^3/hr
United States	NPP Galatin	catfish	Commercial
	NPP Hanford	catfish	Commercial
	CHGS Coloradocity	catfish	Commercial
	CHGS Northsport	oyster	Commercial
Holland	CHGS Flevo	carp (in summer) Chinese carp trout (in winter)	Commercial Floating cages
Italy	Steelworks near Brescia	eel (from the civelles)	Project
Hungary	CHGS Szazamlombatta	sea-pike carp trout	Stocking (30% of the Hungarian total) 25 ha of basin (1 m^2/sec) Commercial
	Hortorbagy		Geothermal } projects
	Svarbas		Geothermal } projects
Poland	CHGS Konin	carp Chinese carp	
USSR	Kirishi	carp and trout	30 t in 1975 - cages
	Skaktinsk	tilapia	Growth in a lake in floating cages
	CHGS Elektricai	carp-sea-pike	
	CHGS Kiev	carp Chinese carp	

NPP = nuclear power plant; CHGS = classical heat generating station.

Forced Cultures

The Greenhouses of Pierrelatte

The compressors of the Pierrelatte isotopic separation plant are cooled with water which, for technological reasons, must not drop to a temperature below 65°.

The output of the cooling circuit, which is 6,000 m^3/hr, thus constitutes an important source of calories.

Since 1972, on the basis of previous studies the CEA has been looking into the possibilities of recovering such a quantity of calories; unfortunately these calories are at low temperature.

Their direct use for industrial or urban heating, which requires either water superheated to 120°/135° or a system at 85°, is difficult without resorting to more sophisticated processes such as heat pumps or the drawing off of steam in order to make the temperature level rise again.

In contrast agricultural applications such as the heating of garden greenhouses, the irrigation of crops with warm water, and the heating of the ground by underground circuits or by surface-level means are more adaptable to an industrial operation.

In order to verify a certain number of industrial hypotheses and to set up a training program to utilize the thermal wastes from Eurodif, the Commission of Programs of General Interest, the Pierrelatte Center, and the Agency for Energy Savings constructed, with the technical and financial collaboration of an industrial greenhouse operator in the region, a set of garden greenhouses heated with calories recovered from the low plant of Pierrelatte.

The greenhouses of the Joint Agricultural Exploitation Group Les Gonsard at Saint-Paul-Trois-Chateaux, set up in the vicinity of the Pierrelatte plant, at the present time cover 3 hectares and will be completed by crops irrigated with warm water coming from the greenhouses.

The calories are removed by an exchanger operating as a shunt on the cooling circuit of the low plant. This exchanger makes it possible in the first stage to reheat 300 m^3/hr taken from the surface level at an average temperature of 15° and to heat it to about 37°.

This warm water is led through an underground pipeline 360 mm in diameter over a distance of 800 m to a set of 27 "tunnel" greenhouses, which to heat the plant uses an original process of plastic covers placed on the ground, developed by the CEA at the Center of Nuclear Studies of Grenoble.

The warm water, whose temperature is regulated according to the requirements, circulates in these covers. It keeps the ground at a remarkably constant temperature suited to the crops being grown.

After having transferred its calories to the ground and to the surrounding air, the water is repumped in the direction of an old gravel pit, which sends it back to the ground water for a new cycle.

The above system has already made it possible to economize several thousand tons of fuel.

Heating of greenhouses according to this technique has been the subject of several tests on a reduced scale, particularly at the Nuclear Studies Center of Grenoble, at a horticultural operation in le Gard, and at Saint-Laurent-des-Eaux near an EDF nuclear power plant.

However the profession has continued to question this innovation, which has the twofold peculiarity:

--of using warm water at a temperature sharply lower than that of classical heating;

--of heating the greenhouse through the ground, consistently maintained at a high temperature.

It was therefore of the greatest interest to conduct such a large-scale experiment in order to be able to establish an indisputable reference. This trial operation foreshadows in particular the agroindustrial developments that will be made possible by the putting in operation of the Eurodif plant in the Tricastin region. A joint effort in this sense has been launched by the Agency for Energy Savings, the CEA, and the Department of Agriculture on the basis of these initial results.

If the results already obtained are confirmed, we will be able to envision a widespread distribution of this type operation, which permits sizable energy savings. Actually there are numerous sources of low power heat: industrial wastes, nuclear power plant wastes, products of geothermal systems....

Although the development of such installations may not represent the only application of all the warm waters that may be available in the near future, it nevertheless seems that this technique is certain to become widespread. Numerous horticultural or garden operations are condemned by the development of urbanization (many have been reestablished in the Mediterranean region, that is particularly favorable), and the production of certain crops in greenhouses is still very widely lacking in relation to the needs both at the national as well as at the European level.

The use of industrial waste waters such as at Pierrelatte certainly constitutes one of the most appealing means of limiting the progression of energy needs in agriculture.

The New Techniques of Cadarache

After more than 5 years of testing by SERE in collaboration with the Chamber of Agriculture of Bouches-du-Rhone, new production techniques have been developed.

These techniques utilize two modes of thermal dissipation:

--circulation of the water in closed circuits using underground equipment;

--open-circuit irrigation by an adaptation of the usual techniques: trickling and sprinkling.

Closed-Circuit Process

Thermal Originality:

Increased circulation of tepid waters in pipes operating in parallel on two front service tanks. This "pin type" setup makes it possible for each pair of adjacent pipes to combine their heat emission to obtain practically homogeneous temperature profiles and ideally flat isotherms.

Originality in Flexibility of Operation:

Numerous variants are offered:

--feeding restricted to one, two, or three pipes or to only one part of the entire "pin" system;

--reversal of the direction of circulation of the water without changing the reheating of the individual parts.

These possibilities permit a functional adaptation to a wide range of agricultural activities:

--use of small and large plastic shelters;

--crop rotations with various planting densities are facilitated by a wise distribution of the excess heat from the wastes based on the need to meet the various requirements of different crops in a given season or the needs of the same crops spread out over several seasons.

A unit module used as a modeling base has been developed.

Arrangements of all sorts are possible from a half-hectare to about 100 hectares on the basis of the unit modules.

Open-Circuit Process

Certain common irrigation techniques are appropriately modified in order to:

--be adapted without major difficulty to the use of tepid waters for agricultural purposes;

--facilitate heat exchanges at the ground-air or plastic-air interfaces, with as a result a microclimate effort in particular under shelter;

--remove a portion of the closed-circuit in order to offset the water deficiency in the ground or the hygrometric deficiency in the air or indeed the water-table losses;

--offer agriculture new markets in sectors as vast as the open fields, the forest areas, and the orchards since the wastes available around power plants (several m^3/sec) largely exceed the irrigation requirements right there.

The methods devised for the growing of crops in open fields make use of the simple type perforated ramps currently used for localized irrigation at a constant linear flow rate and a maximum pressure of two bars. The tepid water flow (4 to 8 liters/hr/min) maintains a different type of trickling over the plastic films according to the desired effect, i.e., soil mulching or protective shelter covering.

We may expect a thermal dissipation of 50 W to 150 W per m^2 and a temperature rise of 5 to 20° from the different accommodations and environmental situations according to the conditions and resources used.

This range of performances permits a wide choice of plant species and a very flexible adaptation to the environmental conditions and the financial resources.

The highly interesting results obtained after several years of operation have revealed a number of facts related to the various types of products.

Growing in Open Field

As far as crops grown in the open field are concerned, the following effects have been observed for the garden products whose forcing period is in winter and spring:

--Strawberry plants: early season effect followed by a rise in the annual autumn production: 50 tons per hectare and headstart achieved of 3 weeks;

--Potatoes: headstart achieved of 1 month;

--Tomatoes and melons: the yields are equal to the higher yields of southern France, and for those whose forcing period lies in autumn;

--Marrow and potato: results as good as those obtained during the spring forcing period.

Thus the calorie utilization period is spread throughout the year with the sole exception of the months of December and January.

It has also been possible to develop two types of crop rotation involving two harvests per year: early season potato followed by autumn tomato; early season eggplant followed by a cutting back, permitting an autumn production.

Also in the single-crop growing of asparagus it is possible to harvest the plant 2 months earlier than the asparagus grown in the traditional manner.

Industrial Cultivation

In the case of soybeans the production is spread out from April to November and permits easy germination and maturation with a production 50 percent greater than the productions of southern France.

The same advantages are obtained with corn.

Cultivation Under Large Tunnels

We are talking here about large plastic tunnels heated by the trickling of tepid water sent in drops by irrigation ramps possibly playing the role of solar captors and positioned high between the two walls, and by warming of the ground (circulation of tepid water through the underground pipes), but also cooled at the end of spring and summer by the trickling of cold water.

The two tunnels constructed at Cadarache have a polyethylene cover lined on the inside with a crystal PVC film.

The supplying of tepid water between the two continuous walls (the system requires air extractors for tunnels greater than 30 meters in length) is accomplished by means of commercially available materials (Agro-DRIP covers = water supply pipes whose double wall is equipped with a built-in distribution channel with perforations every 33 cm). The pressure is 1 bar. The two plastic films are positioned above arches, beneath which they form a recovery drain for the water, which can subsequently be recycled.

Heating Capacity

For example, with 0°C outside temperature and a circulation water at 25°C: 100.Kcal/hr/m^2 covered.

The environment under shelter is thus 12°C from the ground to the peak of the tunnel (absence of disturbing wall effect and reduction of condensation).

Tests of acclimatization to local conditions for varieties of Arabica coffee have made it possible to show that these techniques would permit the plants to weather harsh winters without problem and to blossom in a climatological situation in the neighborhood of the critical thresholds for shrubs (minimum temperature, maximum hygrometry).

A forcing campaign focusing on a crop particularly demanding with respect to temperature, the (black) pepper plant, was conducted over a 2-year period. Thanks to the extension of the production period and to the obtaining of the equivalent of two normal harvests, a new planting was avoided. Tomato and eggplant crops also gave excellent results.

Advantages

Thermal energy savings of 100 percent and moderate water requirements (according to the type of greenhouse, crop, and thermal conditions: 8 to 16 liters/hr m^2 covered).

Very unsophisticated process: simple implementation, flexible operation, polyvalence.

Fed cold water, the system takes in and gives off the solar heat, resulting in a ventilation savings in the greenhouses. In addition the ground with its network of underground pipes constitutes a calorie reserve if the circuit feeding system should break down during the night.

The cost of this heating system is only 15 to 20.00 F per m^2 covered according to the characteristics of the basic module (outside of water supply and pump).

The CETA (5) of the North Alpilles is also studying the possibility of the production of low temperature water from the fermentation of organic materials.

Proof of the fact that this process holds an attraction for greenhouse operators is emphasized by the exceptional aid accorded by FORMA (6) (subsidy of the Department of Agriculture) to the producers on the grounds of energy savings.

Evaluation and Future of the Cadarache Processes

The different tests scheduled, the main results of which have just been reviewed, permit us to make several general observations connected with the effects obtained by reheating:

Production: striking gains in yield and homogeneity of the products;

Gains in the form of plus values: extra charge for raw products and profitability of the additional investments represented by these new techniques;

New possibilities: access for agriculture to the acclimatization of varieties or adaptation of forcing techniques to products currently threatened by disappearance due to the costs of conventional primary energy.

During more than 5 years of uninterrupted experimentation, only effects favorable to plant production have been manifested: the production response (yield and fast growth) attests to this fact. Since the cultivation techniques (fertilization, pesticides, irrigation) are performed in the same way on both the heated and the control sections, neither plant-health problems nor mineral deficiencies have had more intense or frequent effects on the reheated crops.

Several test-taking campaigns conducted on numerous repetitions of varieties permit us to try an initial approach to the effects of permanent microclimate on the phenomena of ground-plant mineral transfers. This attempt at interpretation on the subject of nutritional exchanges helps answer the questions posed by the concerns over preserving the quality of the ground or of the "reheated" agricultural products.

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(5) CETA: Study Center of Agricultural Techniques.
(6) FORMA: Market Organization and Regulation Funds.

Possible Applications

The results obtained permit us to visualize a complex operating on the agro-industrial model using thermal waste from the power plants. Thus the methodology followed for the feasibility studies--for any application to a given climatology site having access to wastes with known seasonal variations--consists of proposing as diversified an arrangement as possible in order to insure optimal usage of the surplus calories available at the waste sites.

The diversification of the system is based on the combinations of open circuits and closed circuits in cascade or parallel and on multiple possible combinations of soil occupancy, depending on the seasonal barriers most appropriate to the local farming needs. Thus defined, the plot modules with a wide production range may accommodate uphill multivaulted greenhouses heated by radiant mulching.

This integrated design offers numerous agroindustrial advantages:

--wiser use of wastes in time and space;

--formation of almost indispensable professional unions or groups;

--working of plots based on rotation of highly diversified crops;

--finally as a consequence of the three points listed previously:

---reduction of the fixed charges (amortization, operation) and therefore of the classical costs of agricultural production (independently of the heating savings) thanks to the grouping of currently independent farming activities;

---autonomy of production for consumable type products (multiplication of plants, seeds, composts, etc.).

Future

After five reheating campaigns we have sufficient knowledge to permit us to visualize systems set up by farmers downhill from industrial installations that discharge reheated water into the rivers.

Furthermore the economic type observations that have been made are favorable and also encourage us to embark on these ventures. The farmers will thus be able to perceive by themselves the advantages that they may draw from this new type of farming. The occupation is tempted to strike out in this direction in different regions.

In the Bouches-du-Rhone:

--at Gardanne over 15 ha, close to a power plant and at different points in the region where water of geothermal origin is available;

--at Pierrelatte with utilization of water coming from the gas diffusion installations of the Pierrelatte and Eurodif plant.

In order to be launched these various projects require the reaching of agreement between the industrial sector and the state agencies in charge of agricultural problems and farming. The choice in the technical and agricultural areas may be made without too many difficulties. The problems of financing and distribution of the charges are harder to solve. It may be hoped that the farming profession which has lost large areas of ground for the construction of railroads, roads, highways, canals, and plants may benefit from favorable decisions handed down by government authorities (Agency for Energy Savings, etc.) and may execute projects of true stature that might permit the development of a new agriculture.

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BRIEFS

CONTRACT FOR WASTE TREATMENT--Following a European bidding competition, Nersa (Note: The Nersa Company (Centrale Nucleaire Europeenne a Neutrons Rapides, SA) [Rapid Neutron European Nuclear Power Plant, joint stock company] is building the Superphenix Supergenerator reactor at Creys-Malville--Nersa is made up of EDF (France), ENEL (Italy), and SBK (German Federal Republic)) selected the Ecopol Company (affiliated with the Italian firm Castagnetti of the Fiat Group) for the study and construction of installations for the treatment of liquid wastes from the Creys-Malville power plant. This order of about 20 million francs concerns in particular a process for treating wastes based on the original CEA patented procedure and developed by the Bureau of Applied Chemistry of Cadarache. Ecopol, Affiliate of CEA and of Serete, specializes in the prevention of environmental nuisances and the construction of facilities for the preservation of the environment. It is under this heading that Ecopol has developed its operations focusing on impact studies and the treatment of effluents and radioactive wastes. Ecopol is specially licensed by the CEA for the French process for embedding radioactive wastes in thermosetting resins, and in this area has just delivered an embedding installation for treating the wastes from the Chooz nuclear power plant. [Text] [Paris CEA NOTES D'INFORMATION in French Dec 80 p 23] 8359

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